



POST OFFICE

# Fourth Report of the Mobile Radio Committee



*LONDON*

HER MAJESTY'S STATIONERY OFFICE

1960

NINEPENCE NET

# Mobile Radio Committee

## Fourth Report

Postmaster General

### Introduction

1. The recommendations in our Third Report, which you accepted in March, 1959, were concerned with the reduction of channel spacing from 50-kc/s to 25-kc/s for land-mobile services in the VHF low band (71·5-88 Mc/s). These narrower channelling arrangements came into force on 1st June, 1959, and the change-over will produce 46 additional two-frequency channels and 7 additional single-frequency channels by June, 1964. We now submit proposals for a similar reduction of channel spacing in the VHF high band (165-173·05 Mc/s).

### Trials of 25-kc/s channelling in the high band

2. Field trials to test the practicability of 25-kc/s channelling in the high band were still in progress at the time of our Third Report (p. 16, para. 14). In the event those trials were completed with amplitude-modulated equipment. The results obtained were very similar to those of the low-band trials and we are satisfied that 25-kc/s channelling in the high band is a practical proposition. The performance specification for 25-kc/s AM equipment in the high band has been agreed between the Post Office and manufacturers and has been published by HM Stationery Office (Specification W. 6298). It can be assumed that the FM counterpart of this specification will be agreed in the near future.

### Present conditions in the high band

3. The high band contains about 7,800 base and mobile stations—approximately one third of the total of licensed land-mobile stations. Nearly all the equipment in the band is amplitude-modulated. From the frequency planning point of view, the situation in the high band is rather complex at the present time because the change-over from the original 100-kc/s channelling to 50-kc/s channelling is still in progress in accordance with the arrangements specified in our Second Report in July, 1956. Under those arrangements, users of 100-kc/s equipment are entitled to keep it in service until January, 1962, and it seems likely that many will do so; indeed, about 3,500 of the old 100-kc/s sets are still in use. Additions and replacements of equipment since 1956 have led to the situation where some users are operating their services with a mixture of 100-kc/s and 50-kc/s equipment together with equipment that is expected to be suitable for 25-kc/s channelling (the latter having been fitted with an eye to the future). We find it reassuring that compatibility can be achieved with such a diversity of equipment. The continued presence of 100-kc/s equipment within a sub-allocation pattern that is currently based on 50-kc/s channels has, however, complicated the processes of frequency assignment and has restricted the use of some of the 50-kc/s channels. We have taken account of this in formulating our proposals for 25-kc/s channelling.

### Need for additional channels

4. During the past 18 months the Post Office has, on our advice, concentrated on high band allocations for new users in certain areas where low band channels

are crowded. In consequence, some of the high band channels have become quite heavily loaded. The overall picture in the land-mobile bands shows that the need for additional channels is as strong as ever, and the growth of the services over the last 12 years is impressive: the figures show that the number of stations has doubled itself *every three years*. This evidence in itself suggests to us that no time should be lost in introducing 25-kc/s channelling to make more channels available for users in the high band. We understand, moreover, that AM equipment meeting the 25-kc/s specification for this band is readily obtainable and costs little more than 50-kc/s equipment. We consider, therefore, that there can be no valid objection to cutting across the existing programme for converting the high band to 50-kc/s channelling, subject to reasonable safeguards being adopted for those users who have already changed to 50-kc/s equipment.

#### Timetable for 25-kc/s channelling

5. Bearing in mind the present commitments in the high band, *we recommend*:

(a) that, from 1st January, 1961, AM equipment for all new services and new AM equipment for existing services should conform to the 25-kc/s specification (W 6298);

(b) that, from 1st January, 1961, FM equipment for all new services should conform to the 25-kc/s specification (see para. 8), but present users of FM systems should be allowed to fit 50-kc/s FM equipment until 1st January, 1966 if equipment meeting the 25-kc/s FM specification proves incompatible with their existing equipment;

(c) that all 100-kc/s equipment remaining in the band at 1st January, 1961 should be replaced by 25-kc/s equipment not later than 1st January, 1962, subject to the proviso in (e) below;

(d) that, by 1st January, 1966, all 50-kc/s equipment in the band should be replaced by 25-kc/s equipment, subject to the proviso in (e) below;

(e) that, exceptionally, the older equipments referred to in (c) and (d) above might continue to be used after the dates specified for their replacement provided:

(i) that they did not cause interference to other services or impede the introduction of new services, and

(ii) that the risk of interference from services on adjacent channels was accepted.

#### Sub-allocation of 25-kc/s channels

6. The plan *we recommend* for the sub-allocation of 25-kc/s channels is at Annex I. In preparing it, we have followed the previous practice of interleaving the new 25-kc/s channels midway between the existing 50-kc/s channels: the 64 additional two-frequency channels produced by this method have been indicated by the suffix "A". As in the low band plan, we have aimed at distributing the additional channels as equitably as possible among the various classes of user, having regard to the evidence of their present usage and their foreseeable requirements. We have earmarked sufficient "Reserved" channels to provide a margin for future adjustment of the distribution of channels among the user-categories, if the need arises. We have also taken the opportunity to include, for the first time in the high band, some channels for the General Purpose, Public Transport, and Municipal & Public Service categories. The single-frequency channels in the current plan are not allocated to user-categories and *we recommend* no change in this respect. A plan of the single-frequency channels on a 25-kc/s basis is at Annex II.

## Implementation of the plan

7. To avoid an excessive amount of adjacent-channel interference while 100-kc/s equipment remains in service and overlaps the new channels, we *recommend* that the 25-kc/s plan be implemented in two stages, namely:—

*Stage 1.* Channels available forthwith for allocation to new services with 25-kc/s equipment have been indicated with the symbol “(i)” in the plan. In the main, these channels have been derived from space kept in reserve since the 50-kc/s plan of the high band came into force. Some of them are clear channels; others will need to be allotted with caution in London and other areas where the surrounding channels are occupied by a large number of 100-kc/s systems (for example, within the group of Commercial channels numbered 48–62) but their early use will avoid a further build-up of co-channel sharing on the “old” channels.

*Stage 2.* Channels which, in our view, should not be allotted to users before January, 1962 have been shown with the symbol “(ii)”. These are interleaved 25-kc/s channels immediately adjoining the more heavily loaded channels of the existing plan (i.e., those allotted on a 100-kc/s basis before 1957). Premature use of the interleaved channels would cause a disturbing amount of adjacent-channel interference, and inevitably the effects would be worst in areas where users already have difficulty with channel-sharing. After January, 1962, however, the problem will be reduced to that of interleaving 25-kc/s with 50-kc/s systems, and it is reasonable to expect that careful allocation of channels will guard against serious difficulty during the final stage of the transition to 25-kc/s channelling.

On channels that are not classified as “(i)”, “(ii)” or “Reserved”, users should, of course, be permitted to install 50-kc/s equipment up to 1st January, 1961 if they wish—though for obvious reasons they should be encouraged to install 25-kc/s equipment.

## Use of FM equipment

8. As stated in para. 2, FM equipment was not included in the field trials of 25-kc/s channelling. We understand, however, that the Post Office has since obtained some experience of 25-kc/s FM equipment under test conditions in the public mobile service in S. Lancashire, which operates on frequencies close to the high band. The equipment used met the provisional specification W6212 and its performance was generally satisfactory. We *recommend* that users who particularly wish to install such equipment on 25-kc/s channels in the high band should be allowed to do so, pending the issue of a final specification.

## Clearance of Television Band III

9. We take this opportunity to mention, with reference to our First Report, that the move of mobile services from Band III to the high band has yet to be completed. This was a very live issue in 1954 when we were appointed as a Committee but, in the event, it has not been necessary to press the mobile users to change the frequencies of their equipment solely to avoid interference with television, apart from a few services that were involved when television Channel 8 was brought into use. In consequence, there are still 110 mobile systems, with a total of about 1,200 base and mobile stations, working on frequencies within television Channels 6 and 7. However, unless those channels are needed for television services within the next 18 months (which, we understand, is somewhat unlikely) the problem will clear itself up. All the equipment in question is the old 100-kc/s type, which is due to be replaced by January, 1962 in any case, and the users will be allotted the appropriate high band channels for their new

equipment. With the additional channels made available by 25-kc/s channelling, no difficulty is foreseen in accommodating these services when they move into the high band.

# Summary of principal conclusions and recommendations

10. Our principal conclusions and recommendations may be summarized as follows:—

- |   | <i>Para. No.</i> |
|---|------------------|
| (1) 25-kc/s channelling in the high band should be started without waiting for completion of the present change-over from 100-kc/s to 50-kc/s channelling.  | 4                |
| (2) From 1st January, 1961, AM equipment for all new services and new AM equipment for existing services should conform to the 25-kc/s specification.   | 5 (a)            |
| (3) From 1st January, 1961, FM equipment for all new services should conform to the 25-kc/s specification, but present users of FM systems should be allowed to fit 50-kc/s FM equipment until 1st January, 1966 if equipment meeting the 25-kc/s FM specification proves incompatible with their existing equipment. | 5 (b)            |
| (4) 100-kc/s equipment should be replaced by 25-kc/s equipment by 1st January, 1962.  | 5 (c)            |
| (5) 50-kc/s equipment should be replaced by 25-kc/s equipment by 1st January, 1966.   | 5 (d)            |
| (6) A new sub-allocation plan for the high band is recommended.   | 6 and Annex I    |
| (7) The sub-allocation plan should be implemented in two stages, the channels shown as Stage 1 being available for immediate allocation to users with 25-kc/s equipment.  | 7                |
| (8) The use of FM equipment meeting the provisional specification should be permitted on 25-kc/s channels, pending the issue of a final specification.  | 8                |

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H. A. BROOKS } *Joint Secretaries*  
A. A. MEAD }

23rd August, 1960.

# Annex I

## RECOMMENDED 25-KC/S CHANNELLING PLAN OF THE HIGH BAND

Mobile Freq. Mc/s		Base Freq. Mc/s	Mobile Freq. Mc/s		Base Freq. Mc/s
	A Reserved		170-75	18 Commercial	165-95
169-9	1 Commercial	165-1	(i)		18A Commercial (i)
	1A Commercial (ii)		(i)	19 Commercial	
(i)	2 Commercial				19A Commercial (i)
(i)	2A G.P.	(i)	(i)	20 M. & P.S.	
(i)	3 G.P.				20A M. & P.S. (ii)
(i)	3A G.P.	(i)		21 Ambulance & Medical	
(i)	4 F. & P.				21A M. & P.S. (ii)
(i)	4A F. & P.	(i)	(i)	22 M. & P.S.	
(i)	5 F. & P.				22A M. & P.S. (ii)
(i)	5A F. & P.	(i)		23 Ambulance & Medical	
(i)	6 F. & P.				23A M. & P.S. (ii)
(i)	6A G.P.	(i)	(i)	24 M. & P.S.	
(i)	7 F. & P.				24A Ambulance & Medical (ii)
(i)	7A G.P.	(i)		25 Ambulance & Medical	
(i)	8 F. & P.				25A Ambulance & Medical (ii)
(i)	8A G.P.	(i)	(i)	26 Ambulance & Medical	
(i)	9 F. & P.				26A Ambulance & Medical (ii)
(i)	9A G.P.	(i)		27 Ambulance & Medical	
(i)	10 G.P.				27A Ambulance & Medical (ii)
(i)	10A G.P.	(i)	(i)	28 Ambulance & Medical	
(i)	11 Industrial				28A Ambulance & Medical (ii)
(i)	11A P.T.	(i)		29 Ambulance & Medical	
(i)	12 P.T.				29A Reserved
	12A P.T.	(i)	(i)	30 Ambulance & Medical	
	13 Industrial				30A Reserved
(i)	13A Industrial	(i)	171-4	31 Ambulance & Medical	166-6
	14 M. & P.S.				31A Industrial & Commercial (ii)
	14A M. & P.S.	(i)			
	15 Commercial*				
	15A Commercial (ii)				
	16 Commercial*				
	16A Commercial (ii)				
	17 Commercial				
170-725	17A Commercial	(ii) 165-925			

\* Taxis only in the London Area.

F. & P. = Fuel and Power

G.P. = General Purpose

P.T. = Public Transport

M. & P.S. = Municipal and Public Services.

Notes:—

(i) STAGE 1—channels available forthwith for new services with 25 kc/s equipment.

(ii) STAGE 2—channels to be brought into use with 25 kc/s equipment from January, 1962.

(on channels not classified (i) or (ii) or "Reserved", users may install 50 kc/s equipment until 1st January, 1961.)

# RECOMMENDED 25-KC/S CHANNELLING PLAN OF THE HIGH BAND—continued

Mobile Freq. Mc/s		Base Freq. Mc/s	Mobile Freq. Mc/s		Base Freq. Mc/s
171-45 (0)	32 Industrial & Commercial	166-65	(0)	48 Commercial	
					48A. Commercial (0)
	32A Industrial & Commercial	(0)	172-3	49 Commercial	167-5
					49A. Commercial (0)
	33 Industrial & Commercial		(0)	50 Commercial	
					50A. Commercial (0)
	34 Reserved			51 Commercial	
					51A. Commercial (0)
	34A. Reserved		(0)	52 Commercial	
	35 Reserved				52A. Commercial (0)
				53 Commercial*	
	35A. Reserved				53A. Commercial (0)
	36 Reserved		(0)	54 Commercial	
					54A. Commercial (0)
	36A. Reserved			55 Commercial*	
	37 Press				55A. Commercial (0)
				56 Reserved	
	37A. G.P.	(0)			56A. Reserved
				57 Commercial	
	38 Press				57A. Reserved
				58 Reserved	
	38A. G.P.	(0)			58A. Reserved
				59 Commercial*	
	39 Press				59A. Reserved
			(0)	60 Commercial	
	39A. G.P.	(0)			60A. Reserved
	40 Press			61 Commercial	
					61A. Reserved
(0)	41 Commercial*		(0)	62 Commercial	
					62A. Reserved
(0)	42 Commercial			63 Industrial	168-2
					63A. Industrial (0)
	42A. Commercial	(0)			
	43 Commercial				
	43A. Commercial	(0)			
(0)	44 Commercial				
	44A. Commercial	(0)			
	45 Commercial				
	45A. Commercial	(0)			
(0)	46 Commercial				
	46A. Commercial	(0)			
172-2	47 Commercial*	167-4	173-0		
	47A. Commercial	(0)			

\* Taxis only in the London Area.

F. & P. = Fuel and Power  
G.P. = General Purpose  
P.T. = Public Transport  
M. & P.S. = Municipal and Public Services.

Notes:—

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(ii) STAGE 2—channels to be brought into use with 25 kc/s equipment from January, 1962.

(on channels not classified (i) or (ii) or "Reserved", users may install 50 kc/s equipment until 1st January, 1961.)

## Annex II

### RECOMMENDED PLAN OF 25-KC/S SINGLE-FREQUENCY CHANNELS IN THE HIGH BAND

168.975- Mc/s	S 1	SINGLE FREQUENCY SERVICES
	S 2	
	S 3	
	S 4	
	S 5	
	S 6	
	S 7	
	S 8	
	S 9	
	S 10	
	S 11	
	S 12	
	S 13	
	S 14	
	S 15	
	S 16	
169.4- Mc/s	S 17	
	S 18	
	S 19	
	S 20	
	S 21	
	S 22	
	S 23	
	S 24	
	S 25	
	S 26	
	S 27	
	S 28	
	S 29	
	S 30	
	S 31	
	S 32	
169.825- Mc/s	S 33	
	S 34	
	S 35	



## Annex III

### COMPOSITION OF THE MOBILE RADIO COMMITTEE

- Mr. W. A. Wolverson, C.B., Post Office (Chairman up to 31.5.60)  
Mr. A. Wolstencroft, Post Office (Chairman from 1.6.60)  
Mr. J. R. Brinkley, Pye Telecommunications Ltd.  
Mr. J. W. Clater, B.Sc.(Eng.), A.M.I.E.E., Marconi's Wireless Telegraph Co. Ltd.  
Mr. H. A. Daniels, Post Office  
Mr. H. D. Edwards, Municipal Ambulance Service, Cardiff  
Miss S. W. Fogarty, Ministry of Transport  
Mr. I. T. Lawman, Ministry of Transport  
Mr. Louis Levy, Mobile Radio Users' Association  
Mr. G. F. Peirson, M.I.E.E., M.Amer.I.E.E., Midlands Electricity Board  
Mr. F. Jervis Smith, M.I.E.E., Institution of Electrical Engineers  
Dr. R. L. Smith-Rose, C.B.E., D.Sc., M.I.E.E., Department of Scientific and Industrial Research  
Mr. C. W. Sowton, B.Sc., A.C.G.I., A.M.I.E.E., Post Office  
\*Mr. H. S. Vian-Smith, M.C., Summerson Holdings Ltd.  
Capt. F. J. Wylle, R.N. (Retd.), Radio Advisory Service to the Chamber of Shipping and Liverpool Steam Ship Owners' Association  
Mr. H. A. Brooks, Mobile Radio Users' Association } Joint  
Mr. A. A. Mead, Post Office } Secretaries

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\* Mr. Vian-Smith was unable to attend the meetings at which this Report was prepared.

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